Enrollment No: ____________

ज्ञानेन प्रकाशते जगत्
INDUS UNIVERSITY

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X-CE0417-003

Semester:	4	**Branch:**	CE/CSE/IT
END SEMESTER EXAMINATION – November 2022			
Subject Code:	CE0417	**Subject Name:**	Data Structure and Algorithms
Date:	18-MAY-2023	**Time:**	3 Hrs. 2:00 PM TO 5:00PM
Day:	THURSDAY	**Total Marks:**	100

Instructions:

1. Attempt all questions
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicates full marks.

Q.1 A **Write steps for the Quick sort algorithm. Apply a quick sort for the array A={9,7,8,3,2,1}, Considering the first element of the array as pivot initially. show each step clearly with necessary illustrations.** **10**

B **Explain each data structure in brief with necessary illustrations & examples:** **10**

1) Stack 2) Queue 3) Single Linked List 4) Tree 5) Graph

Q.2 A **Consider the following queue of characters, where QUEUE is a circular array which is allocated six memory cells:** **10**

FRONT = 2, REAR = 4

QUEUE: ___, A, C, D, ___, ___

(For notational convenience, we use "___" to denote an empty memory cell.)

Describe the queue as the following operations take place:

1. **F is added to the queue.**
2. **two letters are deleted.**
3. **K, L and M are added to the queue.**
4. **two letters are deleted.**
5. **R is added to the queue.**
6. **two letters are deleted.**
7. **S is added to the queue.**
8. **two letters are deleted.**
9. **one letter is deleted.**
10. **one letter is deleted**

B **1. Write an algorithm for push and pop operations on a stack and explain each operation with necessary illustrations and examples.**

2. Find the value of following post-fix expression using stack trace:

5 4 6 + * 4 9 3 / + *

(P.T.O.)

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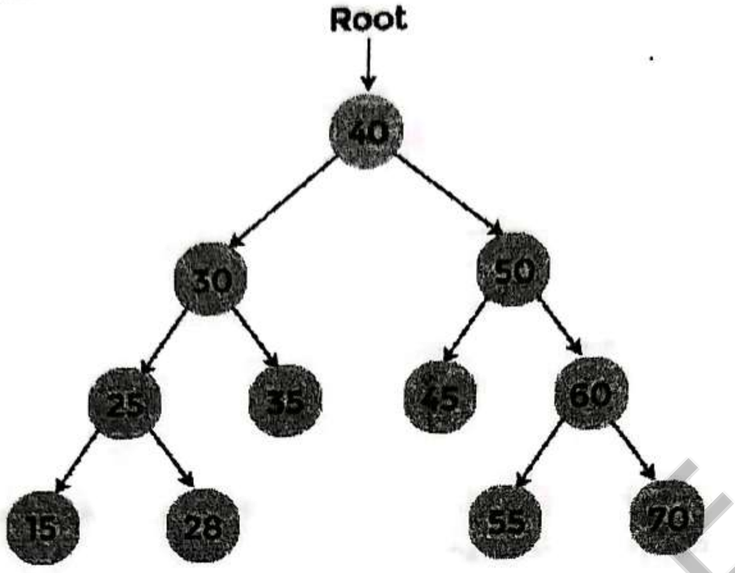
Q.3 A 1. What is a Binary Tree? Find out Post-order traversal of a given binary tree. **10**



2. Given, Post-order –{ 8, 9, 6, 7, 4, 5, 2, 3, 1}and

in-order –{ 8, 6, 9, 4, 7, 2, 5, 1, 3}

Construct a binary tree from post-order and in-order traversal.

B Write a short on breadth first search and depth first search in graph. **10**

Q.4 A Define hash function. Describe various hashing methods with examples. **10**

B Explain Sequential file organizations and list its advantages and disadvantages. **10**

Q.5 Any Four (05*4=20) **20**

A Demonstrate LL and RR Rotations in AVL tree with necessary illustrations and examples. **05**

B Describe the working of the Prim's algorithm with a suitable example. **05**

C Construct Binary Search Tree for the following elements. **05**

{8,3,11,5,9,12,13,4,6,20}

D Explain Multi-key file organization. **05**

E Demonstrate Hash Clash and its resolving techniques. **05**

F What is a file? Describe in brief various operations on a file. **05**

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